ii) a capture probe covalently attached to an electrode; and

iii) at least a first electron transfer moiety (ETM) with a first redox potential;

b) determining the nucleotide at said detection position by detecting said ETM.

44. A method according to claim 43 wherein said first target sequence comprises a first target domain directly 5' adjacent to said detection position, wherein said first hybridization complex comprises said target sequence, said capture probe and an extension primer hybridized to said first target domain of said target sequence, and said determining comprises:

a) contacting said first hybridization complex with:

i) a polymerase enzyme; and

ii) a plurality of nucleoside triphosphates (NTPs) each comprising a covalently attached ETM;

under conditions whereby if one of said NTPs basepairs with the base at said detection position, said extension primer is extended by said enzyme to incorporate said ETM; and

b) identifying the base at said detection position by detecting said ETM.

45. A method according to claim 44 wherein each NTP comprises an ETM with a different redox potential.

46. A method according to claim 43 wherein said first target sequence comprises a first target domain directly 5' adjacent to said detection position, wherein said capture probe

serves as an extension primer and is hybridized to said first target domain, and said determining comprises:

a) contacting said first hybridization complex with:

i) a polymerase enzyme; and

ii) a plurality of NTPs each comprising a covalently attached ETM;

under conditions whereby if one of said NTPs basepairs with the base at said detection position, said capture probe is extended by said enzyme to incorporate said ETM; and

b) identifying the base at said detection position by detecting said ETM.

47. A method according to claim 43 wherein said first target sequence comprises a first target domain directly 5' adjacent to said detection position, said method comprises:

a) forming a second hybridization complex comprising said first target sequence and an extension primer hybridized to said first target domain of said first target sequence;

b) contacting said second hybridization complex with:

i) a polymerase enzyme; and

ii) a plurality of NTPs each comprising a covalently attached ETM;

under conditions whereby if one of said NTPs basepairs with the base at said detection position, said extension primer is extended by said enzyme to incorporate said ETM and form said first target sequence;

c) disassociate said second hybridization complex; and

d) contact said first target sequence with said capture probe to form said first hybridization complex.

48. A method according to claim 43 wherein said target sequence comprises a first target domain comprising said detection position and a second target domain adjacent to said detection position, said method comprising:

a) hybridizing a second ligation probe to said second target domain;

b) hybridizing a first ligation probe to said first target domain wherein if said first ligation probe comprises a base that is perfectly complementary to said detection position a ligation structure is formed;

c) providing a ligation enzyme that will ligate said first and said second ligation probes of said ligation structure to form a ligated probe;

d) forming an assay complex with said ligated probe, a capture probe covalently attached to an electrode, and at least one ETM;

e) detecting the presence or absence of said ETM as an indication of the formation of said ligation structure; and

f) identifying the base at said detection position.

49. A method according to claim 43 for detecting a target sequence:

a) providing a rolling circle probe (RCP) comprising:

i) a first ligation sequence substantially complementary to a first domain of said target sequence;

ii) a second ligation sequence substantially complementary to a second domain of said target sequence; and

iii) a priming sequence;

b) hybridizing said first ligation sequence to said first domain and said second ligation sequence to said second domain to form a first hybridization complex;

c) ligating said first and second ligation sequences together;

d) adding to said first hybridization complex:

i) a primer substantially complementary to said priming sequence;

ii) a polymerase;

iii) NTPs; and

iv) an ETM;

to form a rolling circle concatamer comprising at least one covalently attached ETM;

e) detecting said ETM as an indicator of the presence of said target sequence.

50. A method according to claim 49 wherein said RCP comprises at least one nucleotide analog.

51. A method according to claim 49 wherein said primer hybridizes both to said target sequence and to said priming sequence.

52. A method according to claim 43 wherein said target sequence comprises an ETM with a first redox potential.

53. A method according to claim 43 wherein said hybridization complex further comprises a label probe.

54. A method according to claim 53 wherein said label probe comprises a first base at said detection position and an ETM with a first redox potential.

55. A method according to claim 54 wherein said label probe has a plurality of first ETMs.

56. A method according to claim 43 wherein said determining is done at at least two different temperatures.

57. A method of determining the identification of a nucleotide at a detection position in a target sequence comprising:

a) providing an electrode comprising a covalently attached capture probe with a sequence substantially complementary to a first domain of said target sequence;

b) providing a first label probe comprising a first base at an interrogation position and a first ETM with a first redox potential;

c) providing a second label probe comprising a second base at an interrogation position and a second ETM with a second redox potential;

d) form a hybridization complex comprising said target sequence, at least one of said label probes and said capture probe; and

b) determining the nucleotide at said detection position.